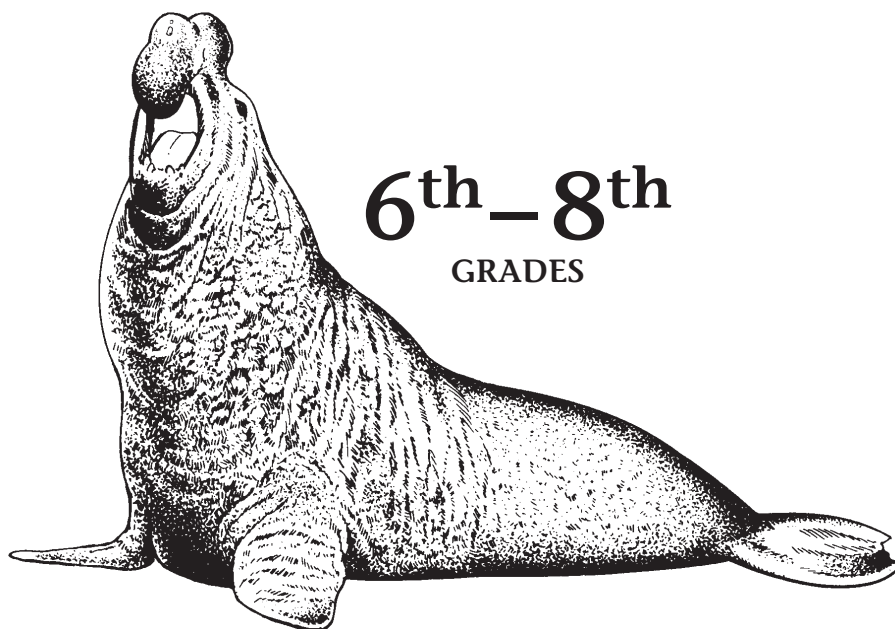


Creating
**COASTAL
STEWARDSHIP**
through Science

Discovering Northern Elephant Seals

at Point Reyes National Seashore

2001 First Edition



6th – 8th
GRADES

This project was made possible by funding from:



Publishing Information

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The listing of a resource in this curriculum does not presume its endorsement by the National Park Service.

This guide may be obtained by participating in a teacher workshop at Point Reyes National Seashore or through a teacher in-service training at your school.

Teachers are encouraged to offer their feedback by filling out the enclosed evaluation form or contacting Point Reyes National Seashore directly.



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Preface

The intent of these guides is to provide middle school students with the opportunity to observe natural processes at Point Reyes National Seashore so they might take a greater interest in environmental stewardship and science. Teachers from fifteen area schools developed and field-tested seven “Creating Coastal Stewardship through Science” guides for classroom and field trip use. Each guide is carefully designed to facilitate a hands-on learning experience using science and the environment. Natural resources such as Pacific gray whales, northern elephant seals, tule elk, California quail, Douglas iris, and the San Andreas Fault are highlighted because they are easy to identify and to observe. All activities are linked to the California State Science Standards (2000) and the National Science Standards.

You may use this guide alone or in conjunction with other guides. We highly recommend that whenever you use a guide, you use the pre-visit activities to fully prepare the students for the field trip. These activities address student safety, wildlife observation techniques, equipment use, field journal development, and concepts that need to be taught prior to the park visit. Use of the post-visit activities is also critical to the learning process because they guide the students in making scientific deductions and in developing their environmental stewardship ethics.

Following this preface, you will find background information on the National Park Service and an overview of Point Reyes National Seashore. To provide your students with a better understanding of the place that they will be visiting, we recommend that you share this information with them. For an in-depth overview of the National Park Service, visit our website at **www.nps.gov**.

Point Reyes National Seashore provides outstanding opportunities for learning about natural and cultural resources. There are also exceptional educational opportunities provided by Park partners such as the Point Reyes Bird Observatory, Audubon Canyon Ranch, and Point Reyes National Seashore Association. To learn more about the Park and our partners, visit our website at **www.nps.gov/pore**.



THE NATIONAL PARK SERVICE

The National Park Service cares for special places saved by the American people so that all may experience our heritage.

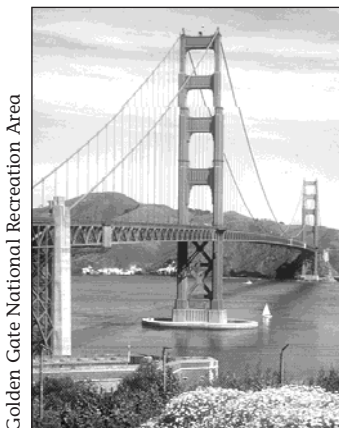
Experience Your America

On August 25, 1916, President Woodrow Wilson signed the act creating the National Park Service, a new federal bureau in the Department of the Interior responsible for protecting the 40 national parks and monuments then in existence and those yet to be established.

This “Organic Act” of 1916 states that “the Service thus established shall promote and regulate the use of Federal areas known as national parks, monuments and reservations . . . by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”



Olympic National Park

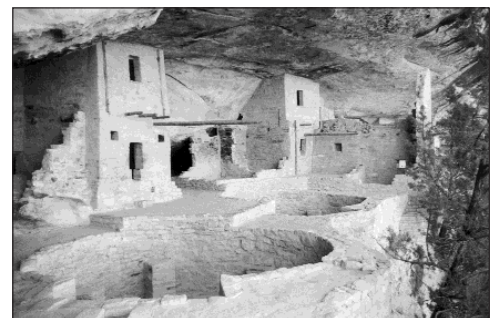


Golden Gate National Recreation Area

The National Park Service still strives to meet these original goals, while filling many other roles as well: guardian of our diverse cultural and recreational resources; environmental advocate; world leader in the parks and preservation community; and pioneer in the drive to protect America’s open space.

The National Park System of the United States comprises over 379 areas covering more than 83 million acres in 49 states, the District of Columbia, American

Samoa, Guam, Puerto Rico, Saipan, and the Virgin Islands. Although not all parks are as well known as the Grand Canyon and Yellowstone, all are areas of such national significance that they have been included in the National Park Service—ancient ruins, battlefields, birthplaces, memorials, recreation areas, and countless other wonders. Point Reyes National Seashore is one of ten national seashores.



Mesa Verde National Park



Grand Canyon National Park

The future of the National Park System lies in understanding and protecting its meanings, values, and resources. Each part of the system represents the United States and a part of our heritage. Preservation of individual sites and the entire system will ensure the essence of quality remains in our lives and the lives of all future generations.



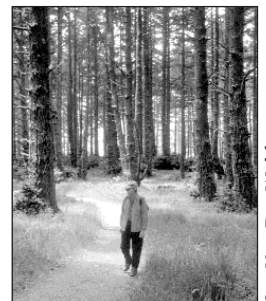
POINT REYES NATIONAL SEASHORE



Bruce Farnsworth

Point Reyes National Seashore was established to preserve and protect the natural and cultural features and natural ecosystems along the diminishing undeveloped coastline of the western United States. Located just an hour's drive from a densely populated metropolitan area, the Seashore is a sanctuary for countless plant and animal species. With half of Point Reyes National Seashore designated as wilderness, it provides a sanctuary for the human spirit—for discovery, inspiration, solitude, and recreation—and a reminder of the human connection to the land.

Point Reyes National Seashore comprises over 71,000 acres, including 32,000 acres of wilderness area. Estuaries, windswept beaches, coastal scrub, coastal grasslands, salt marshes, and coniferous forests create a haven of 80 miles of unspoiled and undeveloped coastline located just an hour's drive from an urban area populated by seven million people. Abundant recreational opportunities include 140 miles of hiking trails, backcountry campgrounds, and numerous beaches.



Sue Van Der Wahl

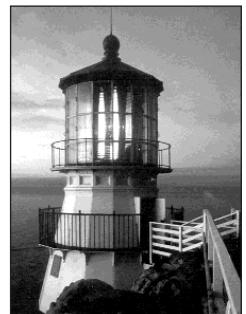
The San Andreas Fault separates the Point Reyes Peninsula from the rest of the North American continent. Granite bedrock found here and not found again until the Sierra Nevada range suggests the peninsula is geologically dynamic. According to geologists, the land that is now called Point Reyes has moved some 300 miles northwest over a period of 100 million years and is still moving.



Rich Stallcup

As wildland habitat is developed elsewhere in California, the relevance of Point Reyes as a protected area with a notably rich biological diversity increases. Over 45% of North American avian species and nearly 18% of California's plant species are found here. Point Reyes also contains some examples of the

world's major ecosystem types. For this reason, and because Point Reyes is dedicated to the conservation of nature and scientific research, it was recognized in 1988 by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Man and the Biosphere program and named as part of the Central California Coast Biosphere Reserve.



Bruce Farnsworth

The cultural history of Point Reyes spans many lives and ways of living with the land. The Coast Miwok people are the first known residents of this peninsula. Archeologists have



NPS Collection

identified over 100 village sites in the Seashore and cultural traditions are still celebrated in the Park annually. Overlapping the Coast Miwok were Mexican land grantees, lighthouse keepers, and lifesaving station crews. To this day, agricultural operations that were built near the turn of the twentieth century continue within the Seashore's pastoral zone.



Educational Opportunities at POINT REYES NATIONAL SEASHORE

Point Reyes National Seashore provides an outdoor classroom and learning laboratory for the study of geological and ecological processes and changing land-use values in which a greater understanding of and caring for public lands can be fostered.

Ranger-led Curriculum-based Education Programs

Reservations for Ranger-led programs are requested in writing and assigned on a first-come, first-served basis. Visit www.nps.gov/pore for the reservation form and calendar.

K-2

Students explore the natural resources of the Seashore with Park Rangers in the Bear Valley area or in their classroom.



NPS Collection

3-4

Students immerse themselves in the Coast Miwok culture by completing a comprehensive curriculum and visiting the Coast Miwok cultural exhibit, Kule Loklo.



NPS Collection



NPS Collection

4

Students revisit the days of early lighthouse keepers while operating the original Point Reyes Lighthouse clockwork with Park Rangers.



NPS Collection

5

Students study the oceanic influences on the Point Reyes Peninsula by completing a classroom curriculum and viewing gray whales and elephant seals with Park Rangers.

6-8

Students participate in Ranger-led stewardship activities such as habitat restoration, water quality monitoring, and beach cleanups.

Ranger-led Training Programs

9-12

Students become DOCENTS to assist middle school teachers with classroom teaching and use of scientific research tools on Seashore field trips (service learning credits earned).

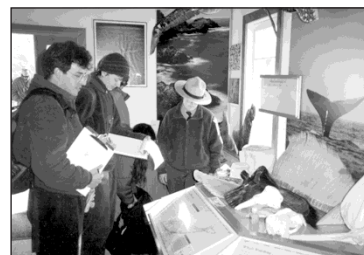


NPS Collection

Students become RESEARCH ASSISTANTS at the Pacific Coast Learning Center by participating in the inventorying and monitoring of Seashore resources.

Teachers

Teacher workshops are offered throughout the year for existing Park curricula and for field trip planning. Visit the Seashore's website at www.nps.gov/pore for a calendar of workshops.



NPS Collection

Classroom and Field Trip Curriculum

Based on the National and State Science and Social Science Standards

3-4



Teacher packets are available for field trips to the recreated Coast Miwok village, Kule Loklo, located near the Bear Valley Visitor Center.

The “Creating Coastal Stewardship through Science” middle school curricula are available to teachers who attend a one-day workshop at Point Reyes or a teacher in-service training.

6-8



Completion of the **Identifying Resident Birds** Curriculum, as a companion to a birdwatching field trip, will enable students to observe and identify different bird species, their habitats and their behaviors. A visit to Point Reyes Bird Observatory will also enable students to observe bird banding and netting and to understand the most common threats to bird survival.



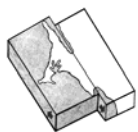
Completion of the **Monitoring Creek Health** Curriculum, as a companion to a Ranger-led creek program, will enable students to observe and understand the complexity and sensitivity of creek habitats and their role in protecting them.



Completion of the **Discovering Northern Elephant Seals** Curriculum, as a companion to an elephant seal viewing field trip, will enable students to observe and understand the amazing adaptations and behaviors of Northern elephant seals.



Completion of the **Defining Habitats** Curriculum, as a companion to a Park field trip, will enable students to observe and understand the complex land and ocean habitats of the Point Reyes Peninsula and their roles in habitat protection.



Completion of the **Uncovering the San Andreas Fault** Curriculum, as a companion to a geology field trip, will enable students to observe and understand the existence of the San Andreas Fault and the implications that it has for area residents.



Completion of the **Investigating Tule Elk** Curriculum, as a companion to an elk viewing field trip, will enable students to observe and understand their behaviors and the issues that surround their management.



Completion of the **Observing Pacific Gray Whales** Curriculum, as a companion to a whale watching field trip, will enable students to observe and understand gray whale adaptations and behaviors, and the factors that influence their survival.

Educational Facilities



The **Historic Lifeboat Station** is available to educational groups for overnight use. Nightly fees are charged. Group size must be under 25 (including chaperones). Reservations are made on a first-come, first-served basis by completing the boathouse form on our website at www.nps.gov/pore.



The **Clem Miller Environmental Education Center** is an overnight facility available by lottery to school groups visiting for multiple-night stays September through May. The facility is used for summer camps during the summer months. Fees are charged. For information, contact Point Reyes National Seashore Association at (415) 663-1200, website www.ptreyes.org.



The **Pacific Coast Learning Center** is a day-use facility located on Highway 1. This facility is used by researchers and students to study the natural and cultural resources of the Seashore.



The **Bear Valley Visitor Center** is a day-use facility open to school groups Monday through Friday from 9 A.M. to 5 P.M. Exhibits on natural and cultural resources are found here. Books, brochures, and other educational materials are available.



The **Ken Patrick Visitor Center** is located on Drakes Beach, approximately 30 minutes from the Bear Valley Visitor Center. This facility is open year-round on weekends and holidays from 10 A.M. until 5 P.M. Ranger-led elephant seal programs meet at this Visitor Center. Exhibits and a 150-gallon saltwater tank are located here. Books, brochures, and other educational materials are available.



The **Lighthouse Visitor Center** is located on the outermost tip of the Peninsula, approximately 45 minutes from the Bear Valley Visitor Center. This facility is open Thursday through Monday from 10 A.M. until 4:30 P.M. (closed Tuesdays and Wednesdays). Ranger-led whale programs and lighthouse tours meet at this Visitor Center. Exhibits on maritime history and whale biology are located here. Books, brochures, and other educational materials are available.



The **Lighthouse** is located below the Lighthouse Visitor Center at the bottom of a 308-step staircase. The lens room is usually open from 2:30 P.M. until 4 P.M. Thursday through Monday or as weather and staffing permit. High winds always close the lens room. Space in the lens room is limited so reservations are required for groups. Call (415) 663-1534 to confirm existing weather conditions.

Group Camping/Overnight Opportunities

* This listing is provided for your convenience and does not constitute a recommendation or endorsement of any of these facilities.



All overnight camping in **Point Reyes National Seashore** requires a permit and advance reservations. Group sites are very limited and in high demand. Sky, Coast, and Wildcat Camps are all backcountry campgrounds that require hiking to access them. A fee is charged. For more information, visit the Seashore's website at www.nps.gov/pore.

The **Point Reyes Hostel** offers a dormitory-style group cabin with a fully equipped kitchen and showers. For additional information and reservations, call (415) 663-8811 during office hours 7:30 to 9:30 A.M. and 4:30 to 9:30 P.M.

Samuel P. Taylor State Park, located 6 miles east of the Seashore on Sir Francis Drake Boulevard, offers campsites for groups. A fee is charged. Reservations are highly recommended. For more information, visit the reservations website at www.reserveamerica.com.

Olema Ranch Campground is located half a mile from Seashore headquarters on Highway 1. It is privately owned. Several large group sites are available. Fees are charged. For more information, call (415) 663-8001.

The **Marconi Center** is located 8 miles north of Seashore headquarters on Highway 1. This facility is operated by California State Parks. Lodging, conference rooms, and catered meals are provided for a fee. For more information, call 1 (800) 970-6644 or visit the website at www.marconiconfctr.org.



National Park
FOUNDATION

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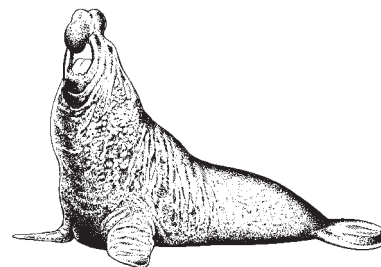


Discovering Northern Elephant Seals

Teacher Preparation	1
Pre-Visit Activities	23
On-Site Activities	85
Post-Visit Activities	111
Resources	133



Creating **COASTAL STEWARDSHIP** *through Science*



Discovering Northern Elephant Seals

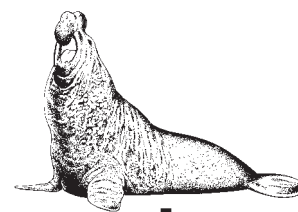
Teacher Preparation

Introduction	1
Considerations	1
Chaperone Preparedness and Assistance	2
Suggested Lesson Plan	3
Field Trip Logistics	4
Evaluation Process	5
Reservations	5
Elephant Seal Kit Contents	5
California Science Standard Links	6
Correlations to “A Child’s Place in the Environment” . . .	7
Acknowledgments	8

Attachments:

Map of Point Reyes National Seashore	9
Map of the Chimney Rock Area	11
Lyme Disease, Stinging Nettle, and Poison Oak	13
Reservation Form	15
Evaluation Form	17
Vocabulary	19

Discovering Northern Elephant Seals



Point Reyes National Seashore is one of the best places in California to see northern elephant seals as they come ashore for breeding and molting. As you watch their behavior, remind yourself that we almost lost this opportunity forever. By 1910, fewer than 1,000 northern elephant seals were believed to be alive. When you observe the elephant seal colonies on the beach, remember they are here because we made decisions to change our lives and our relationship to the planet.

Completion of this unit, as a companion to your park field trip, will enable your students to observe and understand the amazing features and behaviors of northern elephant seals.

Considerations

When: January through March

Where: Elephant Seal Overlook and Historic Lifeboat Station in the Chimney Rock area. Due to the narrowness of the road, school buses cannot access the overlook; cars or vans must be used.

How: This unit may be used independently of all other units. If you want to use an additional unit during your visit, we suggest that you consider the “Observing Pacific Gray Whales” unit. Whales are usually visible January through April from the Point Reyes Headlands.

Teacher Preparation

Creating
**COASTAL
STEWARDSHIP**
through Science





Weather: The chart below lists average climate expectations based on previous years' data. The weather is subject to change quickly and can vary dramatically from different locations within the Seashore on the same day.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Temperature (Fahrenheit)												
Normal Daily Maximum	53	55	55	57	60	62	64	64	65	62	58	54
Normal Daily Minimum	41	42	42	43	47	50	51	52	51	48	45	42
Extreme High	78	85	80	92	94	99	96	96	103	96	81	79
Extreme Low	21	26	29	32	32	39	39	42	39	32	29	18
Precipitation (inches)												
Normal	12.0	9.0	8.0	4.0	3.0	1.0	0.3	0.8	2.0	4.0	9.0	12.0
Maximum	20.0	16.0	15.0	11.5	8.0	4.0	2.5	6.0	7.0	13.0	18.0	19.0

Grade Level: This unit was designed for middle school students (6th–8th grade), but it has been field tested for fifth grades as well. Most lessons can be easily adapted to accommodate the needs of your particular grade.

Seasonal Events: Consult the chart below to assess which months may be best for a class visit to Point Reyes National Seashore.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Gray Whale Migration	✓		✓	✓								
Elephant Seal Breeding	✓	✓	✓									
Bird Migration			✓	✓	✓				✓	✓	✓	✓
Coho Spawning	✓											✓
Steelhead Trout Spawning		✓										✓
Tule Elk Rut Season							✓	✓	✓			
Peak Flower Blooms			✓	✓	✓							
Tidepooling	✓	✓	✓									
Geology	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ocean and Land Habitats	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Resident Birds	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Chaperone Preparedness and Assistance

The success of your field trip will depend on your ability to actively prepare and involve your parent chaperones in the field trip activities. Without adult guidance, many of the students will not complete their field journals. It is essential that your field trip have as much structure as your classroom lessons. To accomplish this, we recommend that you assign each of your parents to a small group of students with the field observations and with the journal questions. Provide each chaperone with their own copy of the student journals and encourage them to complete it with the students.

Suggested Lesson Plan



Teacher Preparation

PRE-VISIT		Time Needed: 8 hours
Activity #1	How Can I Learn about the Secret Lives of Elephant Seals? <i>Students use a newspaper and vocabulary list to complete questions and activities about elephant seals.</i>	2 hours
Activity #2	How Are Elephant Seals Adapted to Their Environment? <i>Using adaptation cards, students create posters identifying elephant seal adaptations.</i>	2 hours
Activity #3	Who Is in the Elephant Seal Food Pyramid? <i>Students identify the components of the elephant seal's food pyramid and create their own version.</i>	2 hours
Activity #4	What Can We Expect on Our Field Trip to Observe Elephant Seals? <i>Students create field journals for use on their field visit to Point Reyes National Seashore.</i>	1 hour
Activity #5	Safety and Stewardship Challenge. <i>Proper behaviors around National Park resources are examined in a game format.</i>	1 hour
Activity #6	How Do I Use Binoculars? <i>Students practice using binoculars in the classroom and outside.</i>	varies
ON-SITE		Time Needed: 3 hours
Field Journal	How Can Teachers, Chaperones, and Students Make the Most of Their Field Trip? <i>Students observe elephant seals and complete their field journals while visiting Point Reyes National Seashore.</i>	3 hours
Optional	How Can We Inspire Others to Protect Elephant Seals and Their Habitat? <i>Students videotape elephant seals during their field trip, then create a presentation for others.</i>	time varies
Optional	How Can I Capture My Experience in a Story, Poem or a Drawing? <i>There are many ways to appreciate elephant seals; here are some suggestions to foster creativity.</i>	time varies
POST-VISIT		Time Needed: 5 hours
Activity #1	How Can We Learn from Our Field Journals? <i>Students compile data from their field journals to draw conclusions between what they have previously learned in class and what they experience in the field.</i>	2 hours
Activity #2	How Are Decisions Made for Elephant Seals? <i>Students research and role-play various interest groups involved in elephant seal management, then develop their own strategy.</i>	2 hours
Activity #3	What Happens at the Marine Mammal Center? <i>Students tour the Marine Mammal Center's rehabilitation hospital to view elephant seal and sea lion patients.</i>	1 hour (and travel time)
Activity #4	How Do I Choose and Complete the Best Stewardship Project? <i>Students develop action plans to complete a project that will benefit habitats and their environment.</i>	time varies



Teacher Preparation

Field Trip Logistics

<i>Students need:</i>	<i>Teachers need:</i>	<i>Chaperones need:</i>
<input type="checkbox"/> rain gear	<input type="checkbox"/> rain gear	<input type="checkbox"/> rain gear
<input type="checkbox"/> warm, layered clothes	<input type="checkbox"/> warm, layered clothes	<input type="checkbox"/> warm, layered clothes
<input type="checkbox"/> gloves and hat	<input type="checkbox"/> gloves and hat	<input type="checkbox"/> gloves and hat
<input type="checkbox"/> sunscreen and sunglasses	<input type="checkbox"/> sunscreen and sunglasses	<input type="checkbox"/> sunscreen and sunglasses
<input type="checkbox"/> bag lunch with drink	<input type="checkbox"/> bag lunch with drink	<input type="checkbox"/> bag lunch with drink
<input type="checkbox"/> water	<input type="checkbox"/> water	<input type="checkbox"/> water
<input type="checkbox"/> waterproof boots or tennis shoes	<input type="checkbox"/> waterproof boots or tennis shoes	<input type="checkbox"/> waterproof boots or tennis shoes
<input type="checkbox"/> clipboard with field journal and pencil	<input type="checkbox"/> map with directions	<input type="checkbox"/> map with directions
<input type="checkbox"/> permission slip	<input type="checkbox"/> pencil sharpeners and extra pencils	
	<input type="checkbox"/> teacher backpack and field trip kits from Bear Valley Visitor Center	
	<input type="checkbox"/> first aid kit	
<i>Optional:</i>		
<input type="checkbox"/> small backpack	<input type="checkbox"/> small backpack	<input type="checkbox"/> small backpack
<input type="checkbox"/> binoculars	<input type="checkbox"/> binoculars	<input type="checkbox"/> binoculars
	<input type="checkbox"/> camcorder/camera	<input type="checkbox"/> camcorder/camera

Other Things to Remember:

- Elephant seals are at Point Reyes during the rainy and windy season. Kids need warm, waterproof clothing. Sunscreen is needed on sunny days.
- The Overlook Trail can be very muddy. Have the students wear closed-toe shoes.
- Ticks are abundant at the overlook area. Have everyone wear light-colored clothing and tuck their pant legs into their socks. Everyone will need to check themselves thoroughly for ticks before returning home. See attachments in this Teacher Preparation for more information.
- Binoculars and spotting scopes will assist the students in viewing the elephant seals. These may be checked out from the Bear Valley Visitor Center. If you plan to use this equipment, it is essential that you train the kids how to use binoculars before their visit. See the enclosed binocular activity.
- Travel time from Point Reyes Station to the elephant seal overlook is 1 hour. Most groups visit the Chimney Rock area between 10 a.m. and 1 p.m. If you plan to visit during this time, have students bring a bag lunch and something to sit on. Following lunch, have them check the entire area for trash.
- The overlook trail is not accessible to wheelchairs. To arrange wheelchair access to the boathouse viewing area, call the Bear Valley Visitor Center at (415) 464-5100 and request that the boathouse gate be unlocked for your field trip. Please do this at least three days before your trip.



Evaluation Process



Teacher Preparation

We need your help! Since this guide was designed for your use, only your feedback will make it work. Following the teacher preparation is a preaddressed evaluation form. Please complete, fold in thirds, affix postage, and drop in the mailbox. In addition to the evaluation forms, we encourage other types of feedback. Please send any of the following items from your students:

1. Video-tape or photos of Park field trip
2. Completed student journals
3. A class portfolio illustrating lesson activities
4. Any completed stewardship activities, including posters or newsletters
5. Any completed classroom projects or photographs of projects
6. Other ways of illustrating student feedback

Please indicate if these items need to be returned. We will use them to create a project library, highlight classroom efforts on our website and in park publications, and to complete evaluations of student outcomes.

Send to: National Park Service
Point Reyes National Seashore
Division of Interpretation
attn: Education Specialist
Point Reyes, CA 94956

Reservations

To avoid conflicts with other groups and to be notified about any unusual closures, please call the Park to notify us about your field trip date and time. Call (415) 464-5139 or e-mail ***PORE_education@nps.gov***. You may also use the reservation form provided in this Teacher's Preparation unit.

Elephant Seal Kit Contents

Kits are available for checkout at the Bear Valley Visitor Center. Clem Miller Environmental Education Center users may check them out at the Ed Center. These are available on a first come, first served basis.

- ☐ 20 pairs of binoculars
- ☐ 1 spotting scope
- ☐ teacher backpack with field guides (birds, plants, flowers, marine mammals)



California Science Standard Links



Teacher Preparation

	"Discovering Northern Elephant Seals" Unit											
	Pre-Visit						On-Site	Post-Visit				
	#1	#2	#3	#4	#5	#6	Field Journal	#1	#2	#3	#4	
Sixth Grade												
1												
2												
3												
4												
5	a,b,- e	c,e	a,b	a,e			a,b,e	a,b,- e	b,e			
6												
7	b,c		d	b,h		b	b,f,h	d,e,- f,h				
Seventh Grade												
1												
2	a											
3	e						e		e			
4												
5	a,d	a,c,d										
6						b,d						
7	a,d		a,c	a		a	a,c	c				
Eighth Grade												
1												
2												
3												
4												
5												
6												
7												
8												
9	b			b			b	b				

Correlations to "A Child's Place in the Environment"

California's State Approved Environmental Education Curriculum



Teacher Preparation

	"Discovering Northern Elephant Seals" Unit										
	PRE-VISIT						ON-SITE	POST-VISIT			
	#1	#2	#3	#4	#5	#6	Field Journal	#1	#2	#3	#4
A Child's Place in the Environment: Grade 6 Lessons											
What Are Some Components of an Ecosystem?	✓		✓					✓	✓		
What Role Does Diversity Play in an Ecosystem?	✓		✓						✓		
How Does the Sun's Energy Flow through an Ecosystem?											
What Interrelationships and Niches Can Be Identified in an Ecosystem?				✓	✓		✓		✓		
What Cycles Exist in an Ecosystem and How Do They Sustain an Ecosystem?	✓			✓							
What Examples of Ecological Principles Can Be Observed in an Ecosystem?	✓		✓	✓			✓	✓			
What Are the Components and Relationships of Human Communities and How Do They Compare to Ecosystems?									✓		
What Are Some Limiting Factors in Human Communities and in Ecosystems?							✓	✓	✓	✓	✓
How Do Energy Sources Used in Human Communities Compare to Those Used in Ecosystems?											
How Can Organic Solid Waste in Human Communities Be Composted?											
How is Land Used by Our Community and How Are Land-Use Decisions Made?								✓	✓		
How Can the Disposal of Solid Waste Affect the Quality of the Environment?											
How Does the Motor Vehicle Transportation System Affect the Environment?											
How Do Human Beings Affect Watersheds?											
What Human Actions Enhance, Protect, and Sustain the Quality of the Environment?	✓		✓		✓	✓		✓	✓	✓	✓
What Have Communities Done to Become More Sustainable?											
What Projects Can Students Implement to Make Their Classroom and School or Community More Sustainable?	✓				✓	✓				✓	✓



Acknowledgments

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Point Reyes National Seashore: Division of Science

Dr. Sarah Allen, Senior Scientist
Dawn Adams, Natural Resource Specialist
David Press, Biologist

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Myrna Vladic, Bad Dog Graphics, San Anselmo
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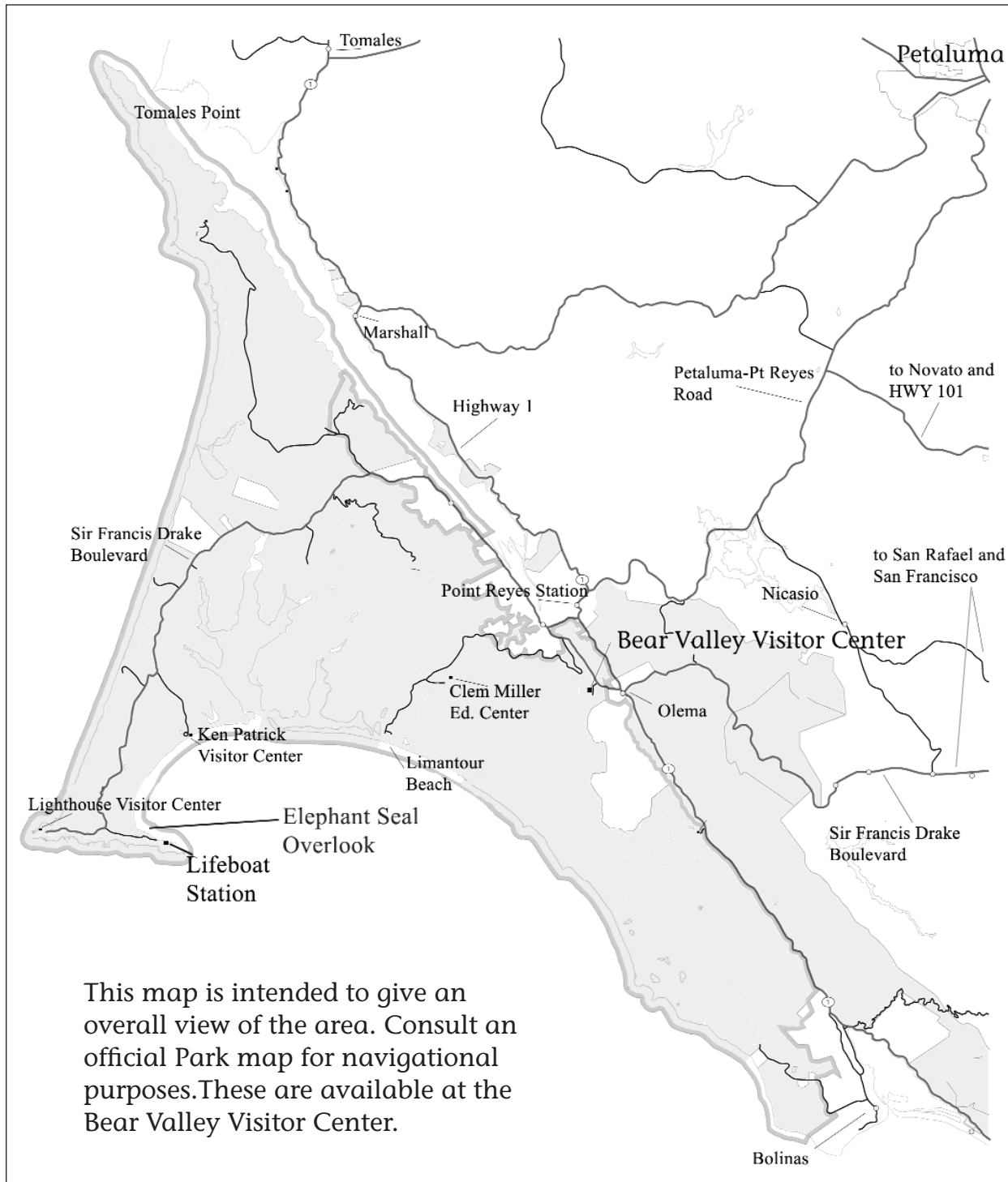
Special Thanks

Dude Williard, Artist, Bolinas

Point Reyes National Seashore



Attachment



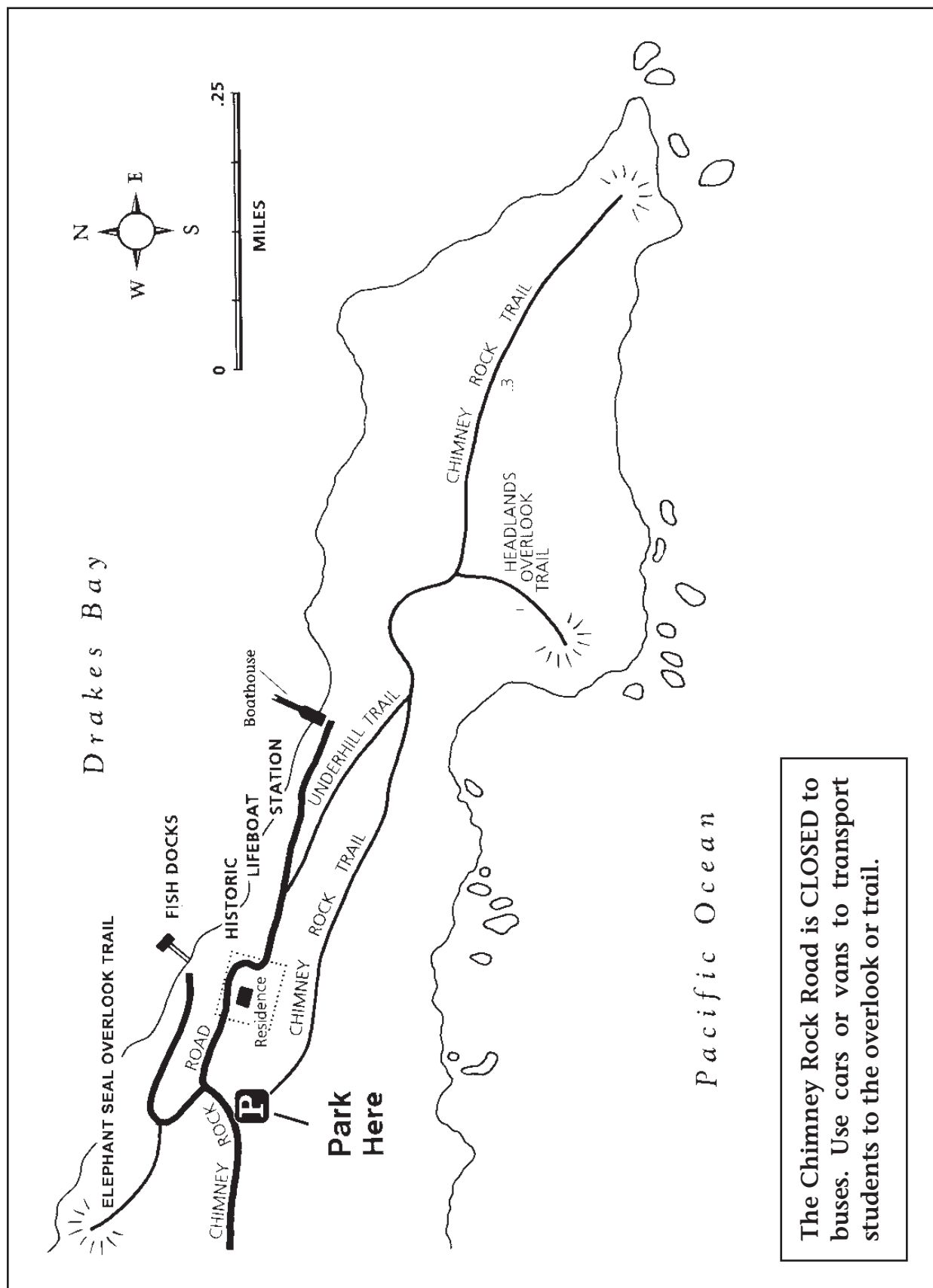
Approximate Driving Times/Distances

Petaluma to Bear Valley VC	40 min./19 miles
Novato to Bear Valley VC	40 min./19 miles
San Anselmo to Bear Valley VC	30 min./20 miles
Bear Valley VC to Limantour Beach	20 min./9 miles
Bear Valley VC to Tomales Point	30 min./19 miles
Bear Valley VC to Ken Patrick VC	30 min./15 miles
Bear Valley VC to Elephant Seal Overlook	45 min./22 miles

Map of Chimmney Rock Area



Attachment



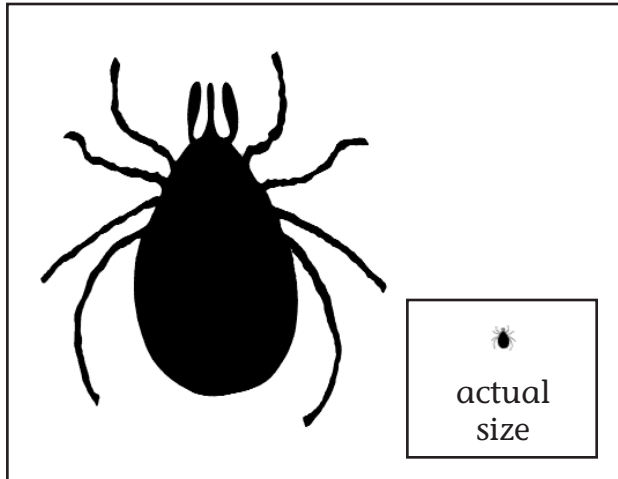
The Chimney Rock Road is CLOSED to buses. Use cars or vans to transport students to the overlook or trail.

Lyme Disease, Stinging Nettle, and Poison Oak



Attachment

Lyme disease is an illness caused by bacteria transmitted to people by tick bites. Not all ticks carry the disease. Field studies in Marin County show that 1–2% of the western black-legged ticks carry Lyme disease. Since there are several other species of ticks in Marin, the odds of a tick bite producing Lyme disease is less than 1 in 100. Even so, Lyme disease can be severe; it is important to understand the prevention and symptoms.



Symptoms:

arthritis and joint pain
lethargy
heart problems
pain/limping
fever
kidney problems
depression
bull's-eye rash (50% of victims)

Tick species in California include:

Western black-legged tick and Pacific coast tick (West Coast)
Lone star tick and American dog tick (throughout U.S.)

How to avoid tick bites:

- Wear light-colored, long-sleeved clothes so you can more easily see the ticks.
- Tuck shirt into pants and pants into socks to keep ticks away from your skin.
- Stay on trails.
- Apply an insect repellent, labeled for ticks, to shoes, socks, and pants.
- Check yourself completely after a hike. Closely check any skin irritation. Ticks anesthetize the skin before biting so you'll seldom feel the original bite.

What to do if bitten:

- Use tweezers to grasp tick at point of attachment, as close to skin as possible. Gently pull tick straight out.
- Save tick, notify your doctor.
- Don't panic—ticks need to be embedded for 24–48 hours to transmit bacteria. The ticks that transmit Lyme disease are usually in a developmental phase in which they are smaller than the head of a pin.

References:

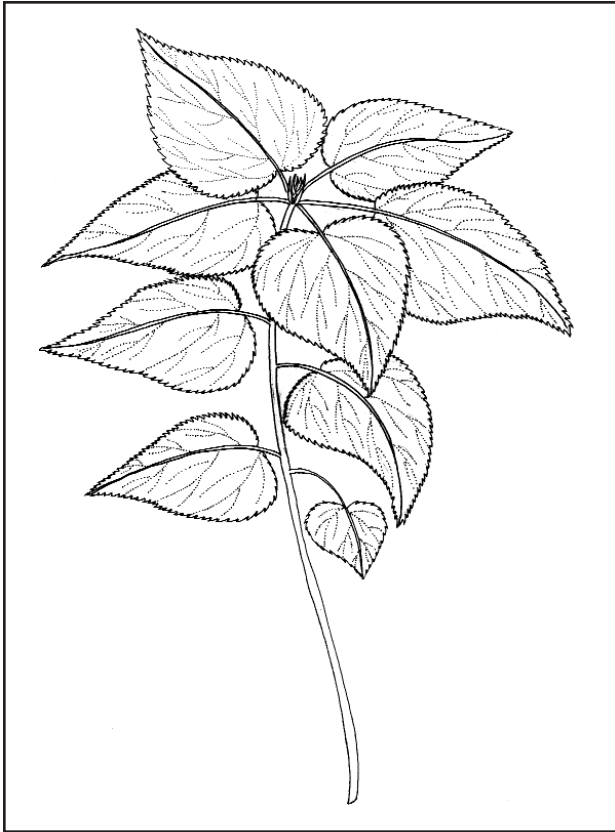
Ticks and Lyme Disease in the National Parks
Lyme Disease Foundation/www.lyme.org



Lyme Disease, Stinging Nettle, and Poison Oak

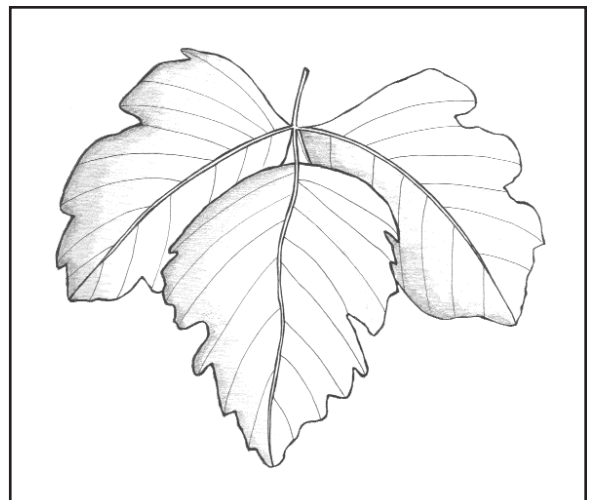
(continued)

Attachment



Stinging nettle is native to Europe, but grows at Point Reyes National Seashore. It can cause a painful rash that stings for up to twelve hours after brushing up against the plant. A topical analgesic (used to treat poison ivy or bug bites) can be applied to help alleviate the sting. Study the picture and have someone point out the plant in the Seashore to aid in its identification.

Poison oak usually causes an itchy rash if you are sensitive to it. You can get a rash by touching the plant, its leaves or roots. You can also contract poison oak by petting your dog (if the oils are on its coat) or by touching clothing that has touched poison oak. Rashes may occur several days after the initial contact with the plant. Severe rashes may affect the lungs. If you have difficulty breathing, call 9-1-1 or go to the nearest emergency room immediately. Preventive topical ointments are available to help avoid reactions to poison oak. Learn to recognize the compound leaves with a shiny appearance.



Creating Coastal Stewardship through Science



Reservation Form

If you are planning a trip to Point Reyes National Seashore to use this curriculum, please notify the Park to avoid conflicts with other groups and to be notified about any unusual closures. Mail this form at least two weeks in advance (fold in thirds and affix postage) or call (415) 464-5139, to leave a message.

Teacher Name: _____

School Name: _____

School Address: _____

City/State: _____ Zip Code: _____

School Phone: _____ School Fax: _____

Email Address: _____

Grade: _____ Class Size: _____

Home Phone: _____

Field Trip Options

Monitoring Creek Health

Observing Pacific Gray Whales

Discovering Northern Elephant Seals

Defining Habitats

Investigating Tule Elk

Uncovering the San Andreas Fault

Identifying Resident Birds

Field Trip Preferences

Field Trip Topic

Dates

Time

(list three in order of preference)

1. _____

2. _____

Comments

_____ Confirmation Letter

_____ Materials Sent



National Park Service
Point Reyes National Seashore
Division of Interpretation
attn: Education Program Coordinator
Point Reyes Station, California 94956



Creating Coastal Stewardship through Science

Please help us develop and improve our programs by taking a few minutes to complete this form. This evaluation form is preaddressed, but needs to be folded in thirds and provided with postage. If you prefer, email comments to:

PORE_Education@nps.gov

Name: _____ School Name: _____

School Address: _____

City/State/Zip Code: _____

School Phone: _____ School Fax: _____

Email Address: _____

Class Size/Grade: _____

Date of Visit: _____ Program/Location: _____

Getting Your Visit Set Up

Do you have any suggestions to make logistics easier? (maps, directions, reserving programs)

Curriculum materials

Which lessons were the most effective?

Relevance of content to my students and curriculum:

Grade appropriateness?

Program assessment

How does this program fit into California/National Standards and your personal education program?

Strengths/weaknesses of program?

Best part of experience?

What is the level of support at your school for this program?

What could the National Park Service do to improve your education program?

Overall, how would you respond if a colleague asked about this program?

Highly recommended Recommended Recommended with some qualifications
Not recommended



Evaluation Form



National Park Service
Point Reyes National Seashore
Division of Interpretation
attn: Education Specialist
Point Reyes Station, California 94956





Vocabulary

Adaptations	an organism's adjustment to environmental conditions that makes it more fit for survival
Advocacy	the active support of a cause
Alpha	a male (elephant seal) that has secured dominance over other males for mating rights
Blubber	the thick layer of fat between skin and muscle layers of marine mammals, a way of storing energy when food is available that keeps elephant seals warm in cold water
Bull	an adult male elephant seal (also, adult male cattle and elk)
Carrying capacity	maximum population of a species that can be sustained in a habitat over the long term; usually refers to a particular species, but can be applied to more than one
Conservation	the wise and careful use of earth's resources
Consumer	a species that relies on other plants or animals for food
Cow	adult female elephant seal (also, adult female cattle and elk)
Delayed Implantation	for elephant seals, the fertilized egg floats in the uterus for up to 3 months before it implants and develops into a fetus
Diatoms	tiny, single-celled algae that form at the bottom of the food pyramid
Dominance	high status in a social group
El Niño	a warm ocean current that develops along the coast of Ecuador and Peru and can cause catastrophic weather conditions
Endangered	threatened with extinction
Environmentally Friendly	behaviors, actions, or products toward a healthy environment
Extinction	the condition of being gone forever
Fetus	a developing organism, prior to birth
First order consumer	an organism, usually an animal, that feeds on plants or other animals



Vocabulary

Food chain	a series of organisms linked together by their feeding habits
Food pyramid	a diagram that shows the relationship between producers and consumers in a food web
Forage	search for food
Fourth order consumer	an organism at the top of the food pyramid
Gestation	time between fertilization and the birth of an offspring
Habitat	the natural environment of an organism; place that is natural for the life and growth of an organism, “address”
Harem	a group of females associated with one male for protection and reproduction (elephant seals and tule elk form harems)
Haul-out	the place where a seal or sea lion comes to land to rest, mate, molt or give birth; the act of coming out of the ocean and onto shore
Krill	small marine crustaceans that are the major food source of baleen whales, but also eaten by elephant seals
Metabolism	the sum total of chemical changes that occur in an organism, elephant seals break down blubber to provide energy. ex: low metabolism or high metabolism
Mission	an overriding goal or strategy used for management, what one believes in
Molt	to shed a skin layer and connected hair to make way for new skin and hair underneath
National Park System	areas of national significance, scenic beauty, or historic importance, preserved for the use and enjoyment of this and future generations
National Park Service	people who manage the National Park System
National Seashore	an area of seacoast set aside and preserved for the public good
Niche	the ecological role, position, or function of an organism in a community of plants and animals, “profession”
Phytoplankton	plankton of plant origin
Pinniped	order of mammals including seals, sea lions, and walruses





Vocabulary

Plankton	microscopic plants and animals floating on the ocean's surface; the primary food source of many marine animals
Population	organisms of the same species that occur in a particular place at a given time; a population may contain several discrete breeding groups or stocks
Preservation	protecting and keeping in an unaltered condition
Primary Producer	plant producing energy from sunlight
Proboscis	a long, flexible snout (nose)
Pup	a newborn elephant seal
Rehabilitation	restoration to a condition of health
Research	scholarly or scientific investigation to understand how things work, used to form basis for management decisions
Restoration	returning something to its original state
Second Order Consumer	an organism, usually an animal, that feeds on other animals
Semiannual	occurring twice a year
Sleep apnea	cessation in breathing while sleeping
Social behavior	behavior between animals
Stewardship	taking care of the environment by being involved; taking action and participating in clean ups and education programs, helping others become more aware, and making responsible choices
Subadult 2	a male elephant seal with a definite large nose, (but not long enough to touch the ground while lying on belly), and no chest shield
Subadult 3	a male elephant seal with a nose long enough to touch the ground when lying on belly, a slightly developed chest shield, and some scarring
Subadult 4	a male elephant seal with a developed nose, (but not a fully developed notch above the nose) and a chest shield that does not rise above the eyes.
Third order consumer	an organism, usually an animal, that is a predator



Vocabulary

Toxin	a poisonous substance
Value	an amount considered to be an equal exchange for something else
Weaned	no longer receiving nourishment through nursing
Weaner	a pup that no longer relies on mothers' milk, under one year of age
Worth	the quality of something that makes it desirable, useful, or valuable
Yearling	an elephant seal that is one year old and has not completed its second year, harbor seal size, blonder, and smaller than all other adults on the beach
Zooplankton	small (often microscopic) aquatic animals suspended or weakly swimming in water